United States Environmental Protection Agency New England

U.S. Environmental Protection Agency (EPA)
Cleanup of the Silresim Site
Lowell, MA

EPA Superfund Program **April 2010**

ARRA Funds

The Silresim Site received $10-25 million in new funding through the American Recovery and Reinvestment Act of 2009. This funding is expected to enable EPA to achieve "construction completion" for the site within two years. Although the remedy will still be in operation after construction completion, the ERH enhancement will improve the long-term performance and success of the groundwater cleanup and reduce the expected clean-up time. By speeding up cleanup, Recovery Act funding is also increasing the speed with which these sites are returned to productive use. When a Superfund site is redeveloped, it can offer significant economic benefits to local communities including future job creation.

Site Description

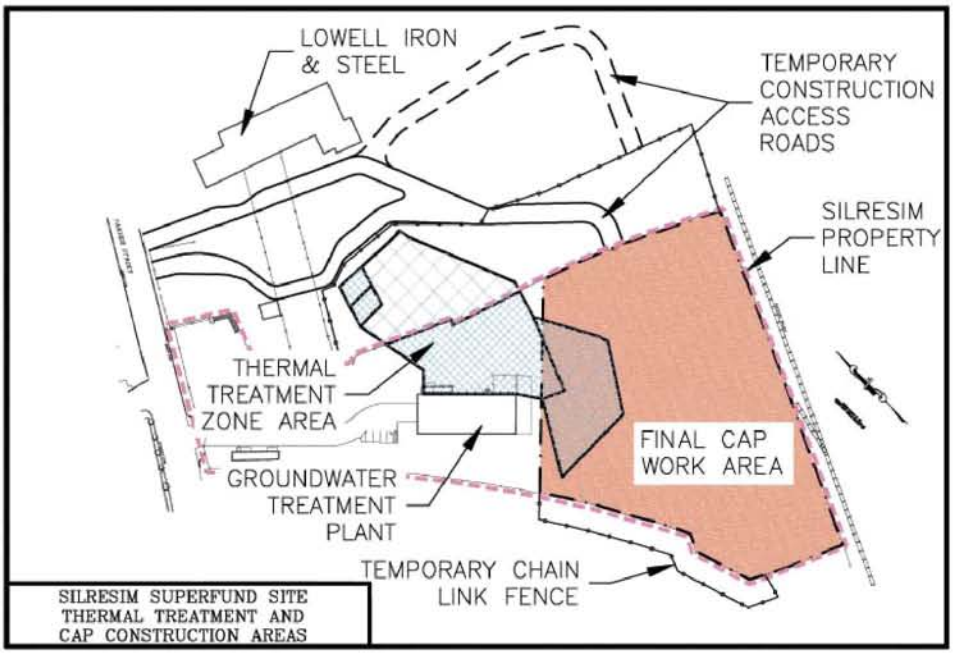
The 4.5-acre Silresim Chemical Corporation site is located in an industrial area along Tanner Street, approximately one mile south of the central business district of Lowell, MA. Starting in 1971, Silresim began reclaiming a variety of chemical wastes, waste oil, and solvents. In 1977, Silresim declared bankruptcy and abandoned the property, leaving behind 30,000 deteriorating drums and several large storage tanks containing volatile organic compounds (VOCs), semi-volatile organic compounds, pesticides, polychlorinated biphenyls (PCBs), and heavy metals. In the early 1980s, the drums and tanks were removed; however, soil and groundwater contamination remained. The site was added to the National Priorities List (NLP) in 1983.

Progress to Date

Since 1997, when the US Environmental Protection Agency began operation of the groundwater treatment plant (GWTP) at the Site, a total of 109 tons of VOCs) have been removed. This amounts to nearly half of what was initially estimated to be present in groundwater. Despite this reduction, it is anticipated that groundwater clean-up goals utilizing pump and treat technology alone would take several hundred years to achieve. In addition, the plume remains relatively widespread and is located predominantly at the groundwater/soil interface (approximately 10 - 12 feet below ground surface (bgs). In 2007, EPA transferred operation of the GWTP to the Commonwealth of Massachusetts, acting through Massachusetts Department of Environmental Protection (MassDEP), who continue to operate the GWTP.

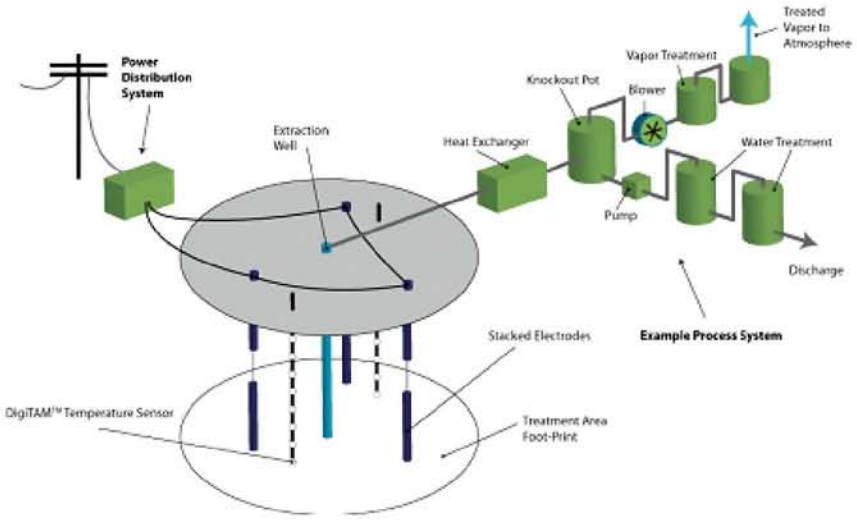
The existing interim cap was constructed in 1984 and was designed to mitigate unacceptable risk from direct contact with contaminated soil; while this cap has been maintained, EPA recently (2008) completed the design for the final cover (details below).

Since 1994, the overall protectiveness of the remedy has been evaluated every five years as required. These Five-Year Reviews have, over time, identified occasional issues which may affect the protectiveness of the remedy. In order for the remedy to be protective in the long term, additional Source Control (i.e., reduction) was necessary. A remedy modification was documented in a 2008 Explanation of Significant Differences (ESD). Among other things, the ESD identified thermal treatment of subsurface contaminants using Electrical Resistive Heating (ERH). The Final cap construction and application of ERH will both be completed in 2010 using American Recovery and Reinvestment Act (ARRA) funding.



ERH enhanced SVE system

The original (1991) remedy called for the operation of an in-situ soil-vapor extraction (SVE) to treat VOCs at the Site, but the technology was found to be ineffective due to site conditions. ERH is a thermally-enhanced SVE system, and this was pilot



(above) *Diagram of ERH System. Photo courtesy of TerraTherm.*

tested from October 2002 to January 2003. The results of the pilot test concluded that while it may be a substantially long time to meet groundwater clean-up goals for all contaminants in all layers beneath the site, it was still less time than pump and treat alone and overall there would be a significant reduction in the majority of contaminants in the most-contaminated layers (i. e. , from 0 - 25 feet). For example, given two of the most prevalent VOCs present at the site, trichloroethylene and methylene chloride, and assuming 95% ERH effectiveness; the estimated clean-up timeframe for trichloroethylene could be reduced from 497 to 37 years and methylene chloride could be reduced from 165 years to 59 years.

The ERH system at the Site will be installed on both the Silresim property and the abutting property north of the site; this area was delineated based on soil and groundwater data with the greatest sources of contamination. The extent of the ERH treatment area is shown on the figure on the previous page. Beginning in Spring 2010, contactors will install the ERH system; this will involve: drilling wells for installation of electrodes to heat the soil and groundwater; running cables to power the electrodes; installing vapor and groundwater collection systems; constructing a treatment system to treat the contaminated vapor, and transferring the extracted water to the existing groundwater treatment facility (for treatment). Construction of the ERH system will involve substantial well drilling activities. These activities are likely to begin in the late Spring and take approximately 3 months to complete. In addition, the drilling operations may require working extended hours – i. e. , past 8 pm (Monday through Saturday) and/or on Sundays.

Once the ERH system is operating, it will generally run continuously and will be monitored and modified to optimize its performance. Real time air and dust monitoring will be conducted along the perimeter of the work area during all intrusive activities (such as drilling) and during operation of the ERH. A fence has been erected around the treatment area and it will be monitored by security personnel.

Modifications to the Cap

The existing interim cap was installed in 1984, with minor alterations since that time. A Final Cap Design was prepared in 2008. In this design, improvements to the existing interim cap were contemplated and consideration was also given as to the future use of the property. Based on a conceptual (undetermined) future use, the City of Lowell advocated that the rear of the Silresim property be made level to support possible future redevelopment. The cap modifications being made in 2010 will include adding a demarcation layer, increasing the cap thickness from 14 to 48 inches, and leveling the final surfaces.

ERH enhanced SVE

Typically, Soil Vapor Extraction (SVE)systems removes harmful chemicals, in the form of vapors, from the soil. Vapors are the gases that form when chemicals evaporate (volatilization). Thermally-enhanced SVE (such as ERH), heats contaminants in both soil and groundwater. Contaminants can volatilize faster and more effectively. ERH employs electrical current through sub-surface electrodes that are monitored and adjusted to keep subsurface temperatures at or above 100 °C. As electrical resistance heating dries the soil, it also creates a source of steam that strips contaminants from soils. The heated contaminants in turn are then pulled through the soil up to the surface and are then collected and safely treated. (See ERH System diagram.)

More Information:

www.epa.gov/region1/superfund/sites/silresim

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